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10/612,149	07/03/2003	Takeshi Masuda	026390-00009	3313

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EXAMINER	
ZERVIGON, RUDY	

ART UNIT	PAPER NUMBER
1792	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/612,149	MASUDA ET AL.	
	Examiner	Art Unit	
	Rudy Zervigon	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 December 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-6,8-11 and 13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-6,8-11 and 13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 April 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1, 3, 4, and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Okase; Wataru (US 5,884,009 A). Okase teaches a film-forming apparatus (Figure 7; column 15, lines 6-67) comprising a gas-mixing chamber (volume between 7a,b; Figure 7; column 15, lines 6-67) for admixing a raw gas (75a,b; Figure 7; column 15, lines 6-67) and a reactive gas (75a,b; Figure 7; column 15, lines 6-67); a film-forming chamber (volume within 7c+piece containing 45; Figure 7; column 15, lines 6-67) connected to the gas-mixing chamber (volume between 7a,b; Figure 7; column 15, lines 6-67), a circular (see perspective of Figure 6) shower head (7c; Figure 7; column 15, lines 6-67) disposed on the top face of the film-forming chamber (volume within 7c+piece containing 45; Figure 7; column 15, lines 6-67); a stage (61; Figure 7; column 15, lines 6-7) for placing thereon a substrate (W; Figure 7) to be processed, the stage (61; Figure 7; column 15, lines 6-7) being disposed inside the film-forming chamber (volume within 7c+piece containing 45; Figure 7; column 15, lines 6-67) and movable in an up and down ("lifting shaft 60"; Figure 7) manner; an exhaust port (flow path / space directly under 71; Figure 7) for discharging an exhaust gas (75a,b; Figure 7; column 15, lines 6-67) from inside the film-forming chamber (volume within 7c+piece containing 45; Figure 7; column 15, lines 6-67), the exhaust port (flow path / space directly under 71; Figure 7) being defined only by a lowermost surface (piece containing 45; Figure 7) of a side wall (71; Figure 7) of the film-forming chamber (volume within 7c+piece containing 45; Figure 7; column 15, lines 6-67) and a lowermost

surface (piece containing 45; Figure 7) of the film-forming chamber (volume within 7c+piece containing 45; Figure 7; column 15, lines 6-67) and located below a level of the stage (61; Figure 7; column 15, lines 6-7) at a time of film formation, the exhaust port (flow path / space directly under 71; Figure 7) being so constructed and arranged that the exhaust gas generated in a space defined by the shower head (7c; Figure 7; column 15, lines 6-67) and the top face of the stage (61; Figure 7; column 15, lines 6-7) is discharged from the exhaust port (flow path / space directly under 71; Figure 7) through a clearance (clearance between 71 and vertical portion of 61; Figure 7) between the side wall (71; Figure 7) of the film-forming chamber (volume within 7c+piece containing 45; Figure 7; column 15, lines 6-67) and the stage (61; Figure 7; column 15, lines 6-7); and a gas mixture prepared in the gas-mixing chamber (volume between 7a,b; Figure 7; column 15, lines 6-67) being introduced into the film-forming chamber (volume within 7c+piece containing 45; Figure 7; column 15, lines 6-67) via the shower head (7c; Figure 7; column 15, lines 6-67), thereby forming a film on the substrate to be processed, wherein a supply port (any of 75a,b; Figure 7) which supplies the gas mixture from the gas-mixing chamber (volume between 7a,b; Figure 7; column 15, lines 6-67) to the shower head (7c; Figure 7; column 15, lines 6-67) is defined only by an outer peripheral surface (portion 75a,b in 74a; Figure 7) of the gas-mixing chamber[1] (volume between 7a,b; Figure 7; column 15, lines 6-67) and an inner surface (portion 75a,b in 74a; Figure 7) of the film-forming apparatus[2] (Figure 7; column 15, lines 6-67), wherein the supply port (any of 75a,b; Figure 7) is disposed above the shower head (7c; Figure 7; column 15, lines 6-67) and is constructed such that the gas mixture supplied from the gas-mixing flows between the gas-mixing chamber (volume between 7a,b;

[1] Applicant's Element 24, Figure 3,4

Figure 7; column 15, lines 6-67) and the inner surface (portion 75a,b in 74a; Figure 7) of the film-forming apparatus (Figure 7; column 15, lines 6-67) and through, as claimed by claim 1.

Okase further teaches:

i. The film-forming apparatus (Figure 7; column 15, lines 6-67) as set forth in claim 1, wherein when the flow rate of the gas (75a,b; Figure 7; column 15, lines 6-67) mixture is large, the shower conductance is small and the gas (75a,b; Figure 7; column 15, lines 6-67) mixture is injected into the film-forming chamber (volume within 7c+piece containing 45; Figure 7; column 15, lines 6-67) from the central portion of the shower head (7c; Figure 7; column 15, lines 6-67) upon the formation of a film, the apparatus (Figure 7; column 15, lines 6-67) is so designed that it comprises a shower head (7c; Figure 7; column 15, lines 6-67) having a large diameter, that the distance between the shower head (7c; Figure 7; column 15, lines 6-67) and the substrate (W; Figure 7) to be processed is increased or that a shower head (7c; Figure 7; column 15, lines 6-67) having a large diameter is used and the distance between the shower head (7c; Figure 7; column 15, lines 6-67) and the substrate (W; Figure 7) to be processed is increased, to thus prevent the central gas (75a,b; Figure 7; column 15, lines 6-67) injection of the gas (75a,b; Figure 7; column 15, lines 6-67) mixture and to make the manner of a gas (75a,b; Figure 7; column 15, lines 6-67) injection of the gas (75a,b; Figure 7; column 15, lines 6-67) mixture uniform, as claimed by claim 3. The entirety of Applicant's claim 3 is an intended use of the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally

[2] No element assigned. "film-forming apparatuses as shown in FIGS. 1 to 3" [0061]

will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey,152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

ii. The film-forming apparatus (Figure 7; column 15, lines 6-67) as set forth in claim 1, wherein when the flow rate of the gas (75a,b; Figure 7; column 15, lines 6-67) mixture is small, the shower conductance is large and the gas (75a,b; Figure 7; column 15, lines 6-67) mixture is injected into the film-forming chamber (volume within 7c+piece containing 45; Figure 7; column 15, lines 6-67) from a shower head (7c; Figure 7; column 15, lines 6-67) and into a region above a substrate (W; Figure 7) to be processed from the periphery of the shower head (7c; Figure 7; column 15, lines 6-67) upon the formation of a film, the apparatus (Figure 7; column 15, lines 6-67) is so designed that it comprises a shower head (7c; Figure 7; column 15, lines 6-67) having a small diameter, that the distance between the shower head (7c; Figure 7; column 15, lines 6-67) and the substrate (W; Figure 7) to be processed is reduced or that a shower head (7c; Figure 7; column 15, lines 6-67) having a small diameter is used and the distance between the shower head (7c; Figure 7; column 15, lines 6-67) and the substrate (W; Figure 7) to be processed is reduced, to thus prevent the peripheral gas (75a,b; Figure 7; column 15, lines 6-67) injection of the gas (75a,b; Figure 7; column 15, lines 6-67) mixture and to make the manner of the gas (75a,b; Figure 7; column 15, lines 6-67) injection of the gas (75a,b;

Figure 7; column 15, lines 6-67) mixture uniform, as claimed by claim 4. The entirety of Applicant's claim 4 is an intended use of the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey,152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

iii. The film-forming apparatus (Figure 7; column 15, lines 6-67) as set forth in claim 1, wherein a gas ring (76; Figure 7; column 14; lines 30-45) is disposed at the periphery of the top face of the film-forming chamber (volume within 7c+piece containing 45; Figure 7; column 15, lines 6-67) so that an inert gas (77; Figure 7; column 15, lines 6-67), which is not directly involved in the film formation, can uniformly be introduced into the film-forming chamber (volume within 7c+piece containing 45; Figure 7; column 15, lines 6-67) through the gas ring (76; Figure 7; column 14; lines 30-45) and along the inner surface of the side wall of the film-forming chamber (volume within 7c+piece containing 45; Figure 7; column 15, lines 6-67), as claimed by claim 11

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 5, 6, 8, 9, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okase; Wataru (US 5,884,009 A). Okase does not teach the relative dimensions of Okase's showerhead (7c; Figure 7; column 15, lines 6-67) diameter vs. Okase's film forming chamber (volume within 7c+piece containing 45; Figure 7; column 15, lines 6-67) diameter as claimed by claims 5. Okase does not teach the relative distance between Okase's substrate (W) and Okase's showerhead (7c; Figure 7; column 15, lines 6-67). Okase further does not teach the operating parameters of pressure and gas flow in the range of the claimed inequalities – claim 6, and 8-10. It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize Okase's relative apparatus dimensions and Okase's operating parameters.

Motivation to optimize Okase's relative apparatus dimensions and Okase's operating parameters is for generating uniform thickness of deposited films as taught by Okase (column 13, lines 20-30). Further, it would be obvious to those of ordinary skill in the art to optimize the operation of the claimed invention (In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980); In re Hoeschele , 406 F.2d 1403, 160 USPQ 809 (CCPA 1969); Merck & Co. Inc . v. Biocraft Laboratories Inc. , 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied , 493 U.S. 975 (1989); In re Kulling , 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990), MPEP 2144.05). Further it is well established that changes in apparatus dimensions are within the level of ordinary skill in the art.(Gardner v. TEC Systems, Inc. , 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied , 469 U.S. 830, 225 USPQ 232 (1984); In re Rose , 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); See MPEP 2144.04)

5. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okase; Wataru (US 5,884,009 A) in view of Reimer; Paul et al. (US 6817377 B1). Okase is discussed above. Okase does not teach a film-forming apparatus (Figure 7; column 15, lines 6-67), which comprises a load-lock chamber for stocking wafers conveyed from a wafer cassette in the atmospheric conditions; a film-forming chamber (volume within 7c+piece containing 45; Figure 7; column 15, lines 6-67); a conveyer chamber positioned between the load-lock chamber and the film-forming chamber (volume within 7c+piece containing 45; Figure 7; column 15, lines 6-67) - claim 13.

Reimer teaches semicondustor processing apparatus (Figure 1) including a load-lock chamber (25c) for stocking wafers conveyed from a wafer cassette in the atmospheric conditions; a film-forming chamber (25a); a conveyer chamber (25b) positioned between the load-lock chamber (25c) and the film-forming chamber (25a).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Reimer's load-lock chamber (25c) and conveyer chamber (25b) to Okase's apparatus.

Motivation to add Reimer's load-lock chamber (25c) and conveyer chamber (25b) to Okase's apparatus is for process automation as taught by Reimer (column 1; lines 10-13).

Response to Arguments

6. Applicant's arguments with respect to claims 1,3-6,8-11 and 13 have been considered but are moot in view of the new grounds of rejection.

7. Applicant states:

"

Applicants respectfully submit that Okase does not disclose, teach or otherwise suggest the process gas supply holes 73a being defined only by an outermost peripheral surface of the process gas supply unit 7 or the spaced defined by the upper disk 7a and middle disk 7b since the gas mixture is clearly taught as passing through the holes 73a formed in the body of the middle disk 7b. That is, the gas mixture does not flow around the middle disk 7b and to the shower head 7c

"

In response, the Examiner notes that he has *never* equated Applicant's claimed "supply port", as Applicant states, as being element 73a of Okase with the claimed structure of "defined only by an outermost peripheral surface of the process gas supply unit". To the contrary, the Examiner has been clear in defining Okase's supply port as being element 75a,b; of Figure 7. Further, the Examiner emphasizes that Okase's drawings of his gas-mixing chamber[3] (volume between 7a,b; Figure 7; column 15, lines 6-67) shows a *constant cross-hatching* which extends, and partly defines, Okase's supply port 75a,b. As such, there are no "disks" per se defining Okase's volume between 7a,b; Figure 7; column 15, lines 6-67.

Applicant states:

"

Additionally, an exhaust duct taught by Okase is defined by a lowermost surface of a side wall 71 of the film-forming chamber and an uppermost surface of the block housing the purge exhaust

[3] Applicant's Element 24, Figure 3,4

duct 45, Therefore, the exhaust duct taught by Okase is not only defined by the lowermost surface of the side wall 71 and lowermost surface of the film-forming chamber.

"

In response, Applicant is partially correct. The new grounds of rejection state that indeed the lowermost surface of a side wall 71 *is* the lowermost surface of the side wall 71 - exhaust port (flow path / space directly under 71; Figure 7). However Applicant's position that the uppermost surface of the block housing the purge exhaust duct 45 is not accurate. The Examiner's new grounds of rejection take the position that the lowermost surface is the piece containing 45; Figure 7 of the film-forming chamber (volume within 7c+piece containing 45; Figure 7; column 15, lines 6-67) and is thus located below a level of the stage (61; Figure 7; column 15, lines 6-7) at a time of film formation.

Applicant states:

"

Furthermore, Applicants submit that if the purge exhaust duct 45 is characterized as corresponding to the exhaust port recited by Claim land 13, then Applicants respectfully submit such an opening would not be considered to be defined only by a lower most surface of the side wall 71 and lowermost surface of the film-forming chamber since the duct 45 is defined by the block and not just the side wall 71 and lower surface of the film-forming chamber.

"

In response, the Examiner's new grounds of rejection redefine his prior art equivalence of the claimed exhaust port (referred to as "duct" above) due to Applicant's December 11, 2008 amendment. Okase's exhaust port can, now, be more than reasonably accepted as being the flow

path / space directly under 71; Figure 7. Such a relationship and definition is guided by Applicant's own exhaust port 32, Figures 3 and 4.

Conclusion

8. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272-1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1792 art unit is (571) 273-8300. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at (571) 272-1435.

/Rudy Zervigon/

Primary Examiner, Art Unit 1792